Biogeochemical and physical processes controlling mercury methylation and bioaccumulation in Lake Powell, Glen Canyon National Recreation Area, Utah and Arizona

David Naftz, *USGS, Montana Water Science Center*
Mark Marvin-DiPasquale, *USGS, National Research Program*
David Krabbenhoft, *USGS, Wisconsin Water Science Center*
Eric Boyd, *Montana State University*
Mark Anderson, *NPS, Glen Canyon National Recreation Area*
Cory Angeroth, *USGS, Utah Water Science Center*
Bonnie Baxter, *Westminster College*

http://water.usgs.gov/nps_partnership/index.php

This program empowers U.S. Geological Survey scientists and National Park Service resource managers to work in a partnership setting to provide the hydrologic information and understanding needed to preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations.

THE RESOURCE

- GLCA attracts > 3 million visitors/year
- Lake Powell provides a “world class” bass fishery
- Chemical contamination of Lake Powell is the highest management priority in GLCA

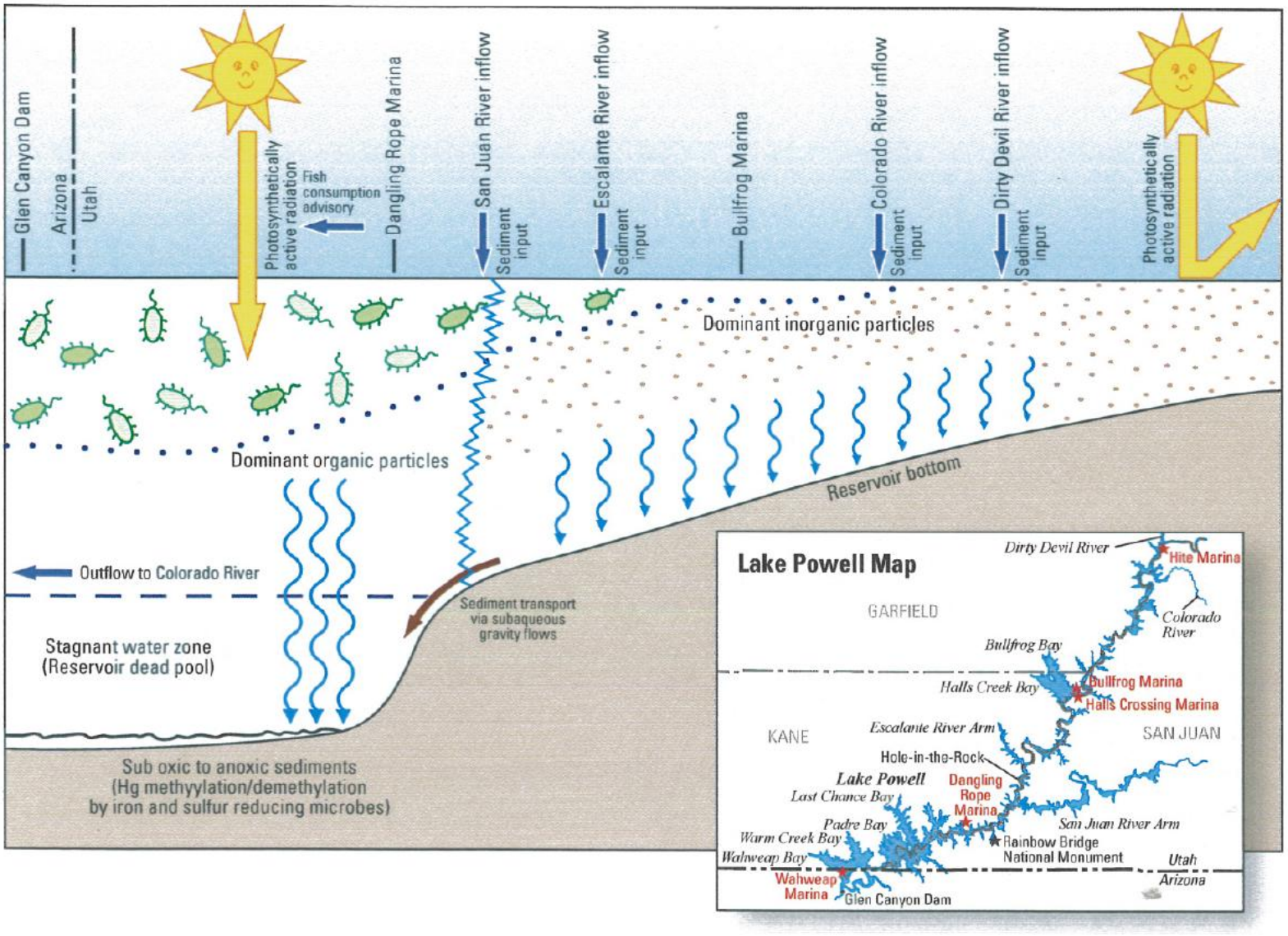
USGS
science for a changing world

Hg ISSUES IN LAKE POWELL

- Elevated Hg in selected stripers/geographic gradient
- Joint consumption advisory issued by UT/AZ in 2012
- No creel limit on striped bass in 2012
- During 2006 > 2 million stripers harvested (Utah DWR, 2009)
- Hg levels in endangered fish from inflow areas exceed fish health standards

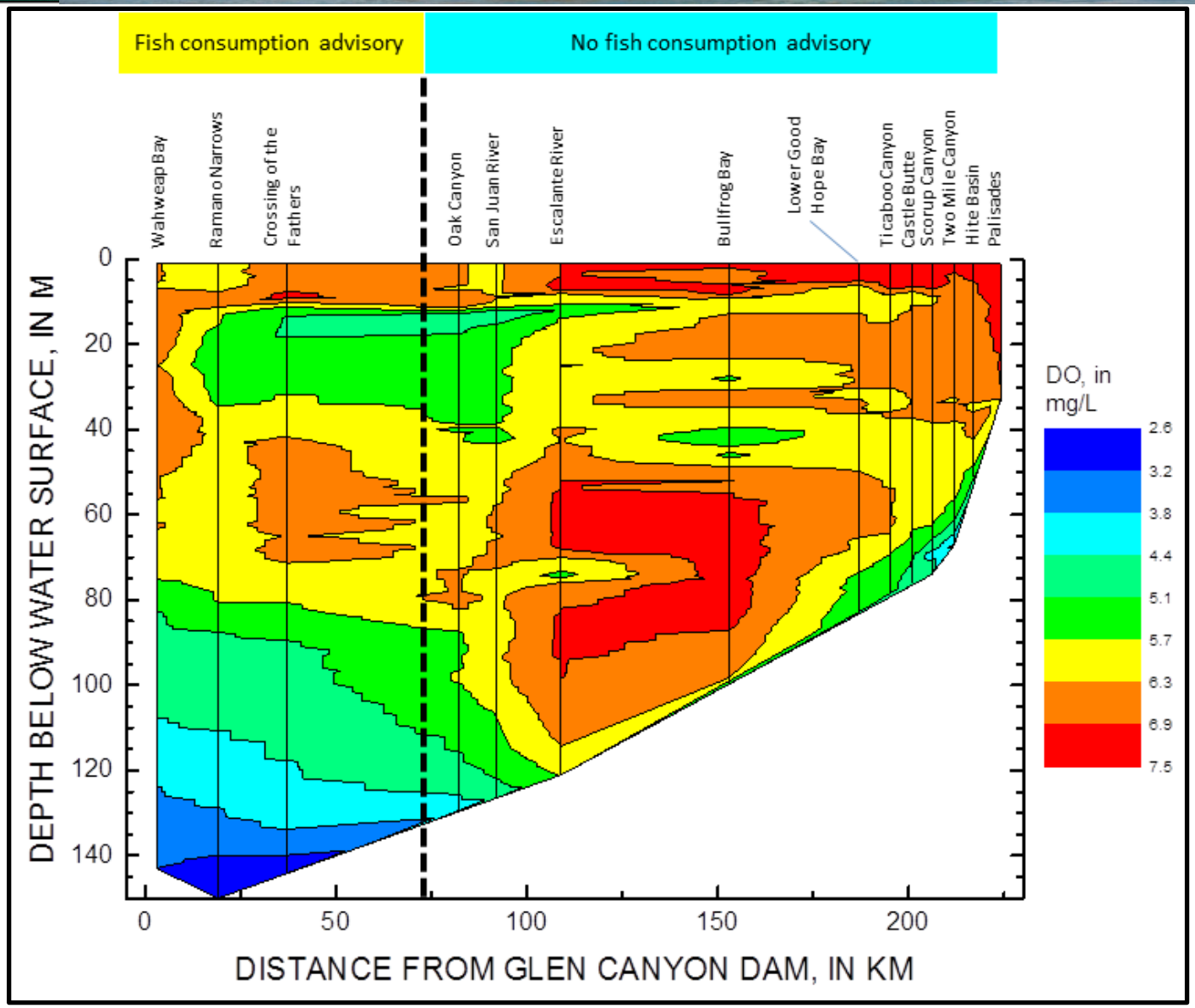
USGS
science for a changing world

CONCEPTUAL MODEL



USGS
science for a changing world

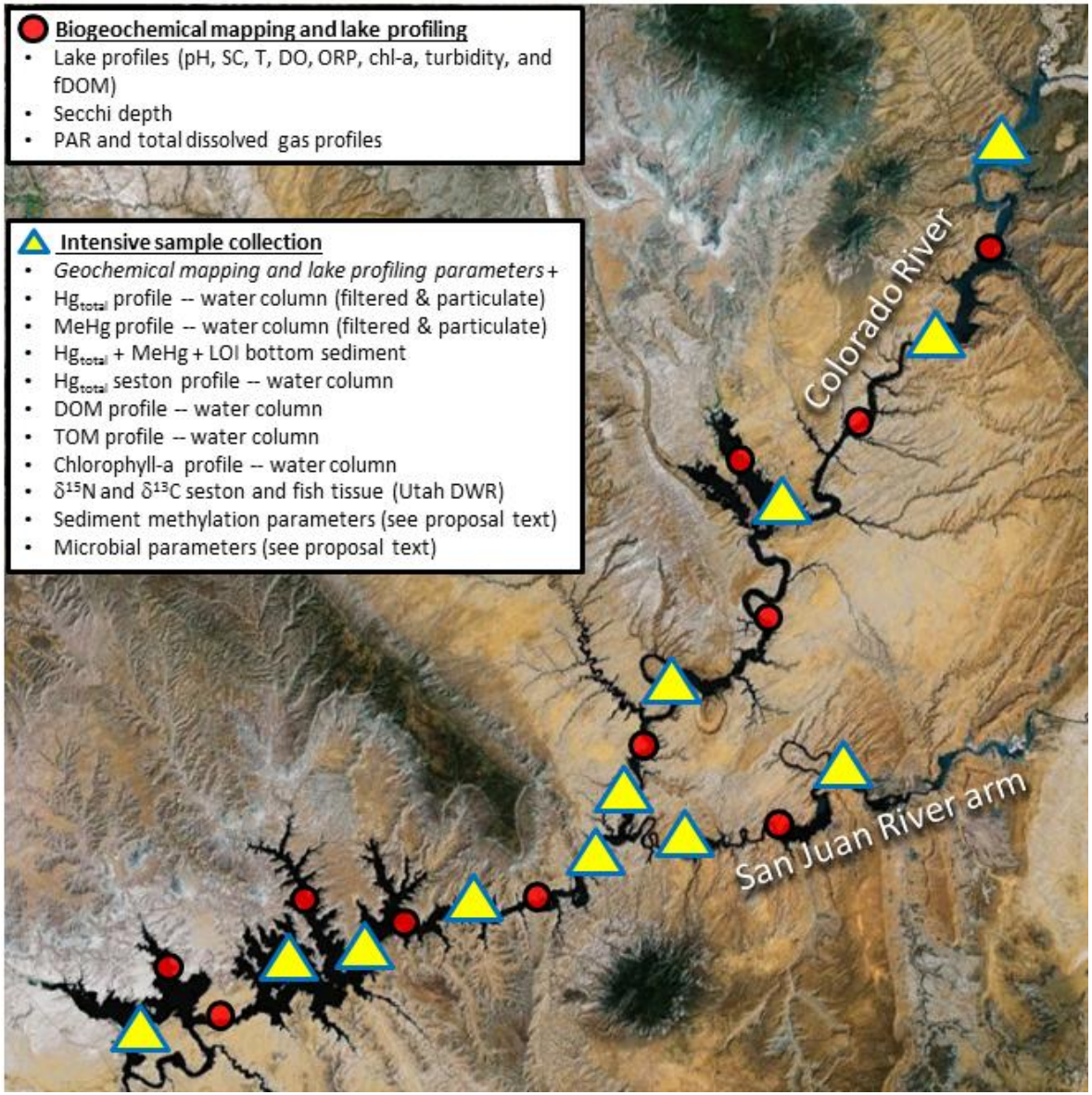
DO GRADIENTS



Data compiled from Marzolf and others (1998)

USGS
science for a changing world

APPROACH



- **Two synoptic cruises (May 2014 and August 2015)**
- **MeHg production and degradation rates in bottom sediments**
- **Biodiversity of potential methylators (e.g., SRB, IRB)**

USGS
science for a changing world

SCHEDULE

Task	FY2014				FY2015				FY2016			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Preparation and background	X	X										
Synoptic sampling transect			X					X				
Sample processing and laboratory analysis				X	X	X		X	X	X		
Data interpretation/report preparation/presentation of results						X	X	X	X	X	X	
Draft reports submitted for technical review											X	X

USGS
science for a changing world

STUDENT RESEARCH

MONTANA STATE UNIVERSITY

Dr. Eric Boyd
Department of Chemistry
and Biochemistry

WESTMINSTER
SALT LAKE CITY • UTAH

Prof. Bonnie Baxter
Department of Biology